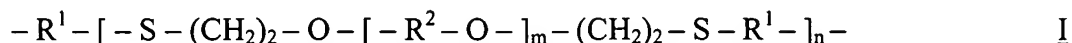


Amendments to the Specification

Col. 2, lines 21-47.

In accordance with one aspect of the present invention, there is provided a polythioether having the formula I



wherein

R^1 denotes a divalent C_{2-6} n-alkylene, C_{3-6} branched alkylene, C_{6-8} cycloalkylene or C_{6-10} alkylcycloalkylene group, $-[(-CH_2)_p-X-]_q-(-CH_2)_r-$, or $-[(-CH_2)_p-X-]_q-(-CH_2)_r-$ in which at least one $-CH_2-$ unit is substituted with a methyl group,

R^2 denotes methylene, a divalent C_{2-6} n-alkylene, C_{2-6} branched alkylene, C_{6-8} cycloalkylene or C_{6-10} alkylcycloalkylene group, $-[(-CH_2)_p-X-]_q-(-CH_2)_r-$, or $-[(-CH_2)_p-X-]_q-(-CH_2)_r-$ in which at least one $-CH_2-$ unit is substituted with a methyl group, X denotes one selected from the group consisting of O, S and $-NR^6-$,

R^6 denotes H or methyl,

m is a rational number from 0 to 10,

n is an integer from 1 to 60,

p is an integer from 2 to 6,

q is an integer from 1 to 5, and

r is an integer from 2 to 10,

the polythioether being a liquid at room temperature and pressure.

Co. 2, lines 50-65

In a first preferred embodiment, the polythioether has the formula II



wherein

A denotes a structure having the formula I,

y is 0 or 1,

R^3 denotes a single bond when $y=0$ and $-S-(CH_2)_2-[-O-R^2-]_m-O-$ when $y=1$,

R^4 denotes $-SH$ or $-S-(CH_2)_2-O-R^5$ when $y=0$ and $[-CH_2=CH_2] \underline{-CH=CH_2}$ or $-(CH_2)_2-S-R^5$ when $y=1$,

R^5 denotes C_{1-6} n-alkyl which is unsubstituted or substituted with at least one $-OH$ or $-NHR^7$ group, and

R^7 denotes H or a C_{1-6} n-alkyl group.

Col. 3, lines 25-43

In a second preferred embodiment, the polythioether has the formula III



wherein

A denotes a structure having the formula I,

y is 0 or 1,

R^3 denotes a single bond when $y=0$ and $-S-(CH_2)_2-[-O-R^2-]_m-O-$ when $y=1$,

R^4 denotes $-SH$ or $-S-(CH_2)_2-O-R^5$ when $y=0$ and $[-CH_2=CH_2]$ $-CH=CH_2$ or $-(CH_2)_2-S-R^5$ when $y=1$,

R^5 denotes C_{1-6} n-alkyl which is unsubstituted or substituted with at least one $-OH$ or $-NHR^7$ group, and

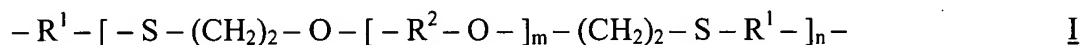
R^7 denotes H or a C_{1-6} n-alkyl group[[]],

z is an integer from 3 to 6, and

B denotes a z -valent residue of a polyfunctionalizing agent.

Col. 5, lines 25-50

In their most general aspect, the inventive polythioethers include a structure having the formula I



wherein

R^1 denotes a divalent C_{2-6} n-alkylene, C_{3-6} branched alkylene, C_{6-8} cycloalkylene or C_{6-10} alkylcycloalkylene group, $-[(CH_2)_p-X]_q-(CH_2)_r-$, or $-[(CH_2)_p-X]_q-(CH_2)_r-$ in which at least one $-CH_2-$ unit is substituted with a methyl group,

R^2 denotes methylene, a divalent C_{2-6} n-alkylene, C_{2-6} branched alkylene, C_{6-8} cycloalkylene or C_{6-10} alkylcycloalkylene group, $-[(CH_2)_p-X]_q-(CH_2)_r-$, or $-[(CH_2)_p-X]_q-(CH_2)_r-$ in which at least one $-CH_2-$ unit is substituted with a methyl group,

X denotes one selected from the group consisting of O, S and $-NR^6-$,

R^6 denotes H or methyl,

m is a rational number from 0 to 10,

n is an integer from 1 to 60,

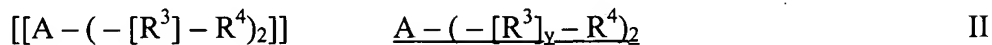
p is an integer from 2 to 6,

q is an integer from 1 to 5, and

r is an integer from 2 to 10.

Col 6, lines 40-55

A first preferred embodiment of the inventive polythioethers has the formula II



wherein

A denotes a structure having the formula I,

y is 0 or 1,

R³ denotes a single bond when y=0 and -S-(CH₂)₂-[-O-R²-]_m-O- when y=1,

R⁴ denotes -SH or -S-(-CH₂-)₂-O-R⁵ when y=0 and [[-CH₂=CH₂]] -CH=CH₂ or -
(CH₂-)₂-S-R⁵ when y=1,

R⁵ denotes C₁₋₆ n-alkyl which is unsubstituted or substituted with at least one -OH or -
NHR⁷ group, and

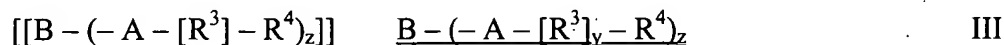
R⁷ denotes H or a C₁₋₆ n-alkyl group.

Col. 7, lines 4-7

In a more particular preferred embodiment of the foregoing polythioether, when $m=1$ and $R^2 = \text{n-butylene}$ in formula II, R^1 is not ethylene or n-propylene. Also preferably, when $m=1$, $p=2$, $q=2$, $r=2$ and $R^2 = \text{ethylene}$, X is not O.

Col. 7, line 53 to col. 8, line 4.

Polyfunctional polythioethers according to the present invention thus preferably have the formula III



wherein

A denotes a structure having the formula I,

y is 0 or 1,

R^3 denotes a single bond when $y=0$ and $-S-(CH_2)_2-[-O-R^2-]_m-O-$ when $y=1$,

R^4 denotes $-SH$ or $-S-(CH_2)_2-O-R^5$ when $y=0$ and $[-CH_2=CH_2]$ $-CH=CH_2$ or $-$

$(CH_2)_2-S-R^5$ when $y=1$,

R^5 denotes C_{1-6} n-alkyl which is unsubstituted or substituted with at least one $-OH$ or $-$

NHR^7 group,

R^7 denotes H or a C_{1-6} n-alkyl group,

z is an integer from 3 to 6, and

B denotes a z-valent residue of a polyfunctionalizing agent.

Col. 8, lines 63-67.

The compounds of formula IV are dithiol compounds. Preferred dithiols include those compounds in which R¹ is a divalent C₂₋₆ n-alkylene group, i.e., 1,2-ethanedithiol, 1,3-propanedithiol, 1,4-butanedithiol, 1,5-pentanedithiol or 1,6-hexanedithiol.

Col 9, lines 1-10.

Additional preferred dithiols include those compounds in which R¹ is a divalent C₃₋₆ branched alkylene group, having one or more pendent groups which can be, for example, methyl or ethyl groups. Preferred compounds having branched alkylene R¹ include 1,2-propanedithiol, 1,3-butanedithiol, 2,3-butanedithiol, 1,3-pentanedithiol, 1,3-dithio-3-methylbutane and 2,3-butanedithiol. Other useful dithiols include those in which R¹ is a divalent C₆₋₈ cycloalkylene or C₆₋₁₀ alkylcycloalkylene group, for example, dipentenedimercaptan and ethylcyclohexyldithiol (ECHDT).

Col. 9, lines 47-62.

Exemplary divinyl ethers include those compounds in which R² is C₂₋₆ n-alkylene or C₂₋₆ branched alkylene. Preferred divinyl ethers of this type include ethylene glycol divinyl ether (EG-DVE) (R²=ethylene, m=1); butanediol divinyl ether (BD-DVE) (R²=butylene, m=1); hexanediol divinyl ether (HD-DVE) (R²=hexylene, m=1); diethylene glycol divinyl ether (DEG-DVE) (R²=ethylene, m=2); triethylene glycol divinyl ether (R²=ethylene, m=3); and tetraethylene glycol divinyl ether (R²=ethylene, m=4). Useful divinyl ether blends include "PLURIOL®" type blends such as PLURIOL® E-200 divinyl ether (commercially available from BASF), for which R²=ethylene and m=3.8, as well as "DPE" polymeric blends such as

DPE-2 and DPE-3 (commercially available from International Specialty Products, Wayne, N.J.).

Of these, DEG-DVE and PLURIOL® E-200 are particularly preferred.

Col. 9, lines 63-67

Useful divinyl ethers in which R^2 is C_{2-6} branched alkylene can be prepared by reacting a polyhydroxy compound with acetylene. Exemplary compounds of this type include compounds in which R^2 is an alkyl-substituted methylene group such as $-CH_2(CH_3)-$ or $-CH_2CH(CH_3)-$.

Col. 10, lines 52-59

According to another preferred method, (n) equivalents of a compound having the formula $[[!V]]$ IV, or a mixture of at least two different compounds having the formula IV, are reacted with (n+1) equivalents of a compound having the formula V, or a mixture of at least two different compounds having the formula V, again in the presence of an appropriate catalyst. This method affords an uncapped, vinyl-terminated difunctional polythioether.